UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,563	11/13/2003	Joseph Phillip Bigus	ROC920020170US1	8807

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EXAMINER
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ART UNIT	PAPER NUMBER
2129	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/712,563	BIGUS ET AL.
	Examiner	Art Unit	
	Omar F. Fernández Rivas	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2006*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some *   c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *A1, A2*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

1.   This Office Action is in response to an AMENDMENT made by the Applicant

filed on November 115, 2006.

2.   The Office Action of May 15, 2006 is incorporated into this Final Office Action by

reference.

Status of Claims

3.   Claims 1, 7, 12, 18 and 24 have been amended. Claim 30 has been added.

Claims 1-30 are pending on this application.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless —(b) the invention was patented or described in
> a printed publication in this or a foreign country or in public use or on sale in this country, more than one
> year prior to the date of application for patent in the United States.

Claims 1- 11, 13 -16, 18-29 are rejected under 35 U.S.C. 102(b) as being

anticipated by Steven D. Kaehler ("Fuzzy Logic"; Parts 1-6).

As per claims 1, 18, and 24 Kaehler anticipates an apparatus, said apparatus

comprising: a controller (a proportional temperature controller, page 2) a curve matching

mechanism (Part 4, page 1 "Membership Function"; the examiner reads "Membership

function as a curve matching mechanism because it defines the overlaps between

inputs and outputs a response) that executes under the direction of said controller, said

curve matching mechanism receiving curve data as an input (Part 3, page 1, lines 6-13,

pages 3-4, figures 3-4; Part 4, Figure 6; Input has two conditions "error" and "error-dot".

Moreover, the values in the rule matrix are used as input to plot the graph of the

membership function), said curve data comprising a plurality of data points representing

a curve (Part 1, page 2, lines 13-16; Part 3, page 1, lines 6-13, pages 3-4, figures 3-4;

Part 4, figure 6; Error-dot is the error slope or rate of change (a curve) of the data

received (plurality of points). Moreover, the values in the rule matrix (a plurality of data

points) will be used to plot the graph of the membership function.), said curve matching

mechanism using Fuzzy Logic to describe said curve represented by said curve data

and to thereby create curve data description information, said curve data description

information (the examiner reads the output curve as "curve data description

information") then being available to said controller (Part 3, page 2 Figure 1; looking at

figure 1 it shows the output being distributed to the heater and cooler then to the

"controlled" environment)

As per claims 2, 19 and 25, Kaehler anticipates the apparatus of claim 1 wherein

said controller is a Fuzzy Logic controller that executes on a processor (Part 1, page 2,

the examiner reads that a Fuzzy logic can be built into a large computerized process

control system which can be a processor').

As per claims 3, 8, 20 and 26, Kaehler anticipates the apparatus of claim 1

wherein said curve data is time series data (Fig. 2; the examiner reads the axis labeled

"Time" as time series data).

As per claims 4, 9, 21 and 27 Kaehler anticipates the apparatus of claim 1 wherein said curve data is described by comparing said curve data to at least one standard curve, said at least one standard curve being a Fuzzy Set (Part 4, page 1, Define functional overlaps between inputs to determine their influence on the "fuzzy output sets". The examiner reads that the output set is a Fuzzy set.

As per claims 5, 10, 22 and 28, Kaehler anticipates the apparatus of claim 1 wherein said curve data description information is an output curve (Part 6, Figure 8; the examiner reads figure 8 as the out curve for the data).

As per claims 6, 11, 23 and 29, Kaehler anticipates the apparatus of claim 5 wherein said at least one output curve shows a degree of similarity between said curve data and said at least one standard curve (Part 4, Figure 7; the examiner reads the graph showing the degree of membership which is the similarity between inputs).

As per claim 7, Kaehler anticipates an apparatus, said apparatus comprising: a Fuzzy Controller that executes on a processor (See rejection of claim 2 as set forth above), and a curve matching mechanism that executes under the direction of said Fuzzy Controller, said curve matching mechanism receiving curve data as an input, said curve data comprising a plurality of data points representing a curve, said curve matching mechanism using Fuzzy Logic to describe said curve represented by said

curve data and to thereby create curve data description information, said curve data

description information then being available to said Fuzzy Controller, said Fuzzy

Controller then using said curve description information to at least partially control said

apparatus (See rejection of claim 1 as set forth above).

As per claim 30, Kaehler anticipates a method, said method comprising the steps

of: receiving data representing an input curve as input (Part 4, Figure 6; Input has two

conditions "error" and "error-dot". Error-dot represents the rate of change (a curve) of

the data); determining membership of said input curve in at least one Fuzzy Set, each

said Fuzzy Set expressing a property of a respective at least one curve (Part 4, pages 1

and 2; the output curve generated will express the properties of the input curve);

outputting at least one respective input curve membership value representing degree of

membership of said input curve in each said Fuzzy Set (Part 4, pages 1 and 2;

determining the degree of membership); and using said at least one respective input

curve membership value to at least partially control an apparatus (Part 2, page 2, lines

8-25; Part 6, page 3, "Tuning and system Enhancement").

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 12-17 are rejected under 35 U. S. C. 103(a) as being unpatentable over

Kaehler as set forth above, in view of Kamihira (US Patent No. 6,278,986).

As per claims 12 and 17, Kaehler teaches the method of a Fuzzy Controller that

executes on a processor and a curve matching mechanism that executes under the

direction of said Fuzzy Controller, said curve matching mechanism receiving curve data

as an input, said curve data comprising a plurality of data points representing a curve,

said curve matching mechanism using Fuzzy Logic to describe said curve data and to

thereby create curve data description information, said curve data description

information then being available to said Fuzzy Controller, said Fuzzy Controller then

using said curve description information to at least partially control said apparatus as set

above in claim 7.

Kaehler does not disclose expressly an engine.

Kamihira et al. discloses an automobile engine (Col. 20, Lines 31-33, Fig. 3)

Kaehler and Kamihira are analogous art because they both deal with fuzzy logic on a

large computerized process control system.

At the time of the invention it would have been obvious to a person of ordinary

skill in the art to substitute the automobile engine of Kamihira for the heating/cooling

system of Kaehler. (See, Kaehler, Part 3, page 2 of 5, first line.)

Motivation for doing so would have been to be able to analyze measurements

and to make adjustments to the engine's behavior.

Therefore, it would have been obvious to combine Kamihira with Kaehler for the

benefit of having a fuzzy controller and an automobile engine that uses fuzzy logic to

create curve data description information to obtain the invention as specified in claim

12.

As per claim 13, Kaehler teaches this limitation as set forth above in the rejection

of claim 3 and is rejected on the same basis.

As per claim 14, Kaehler teaches this limitation as set forth above in claim 4 and

is rejected on the same basis.

As per claim 15, Kaehler teaches this limitation as set forth above in claim 5 and

is rejected on the same basis.

As per claim 16, Kaehler teaches this limitation as set forth above in claim 6 and

is rejected on the same basis.

As per claim 17, Kamihira teaches the apparatus of claim 12 in view of Kaehler

as set forth above wherein said engine is contained within a vehicle (Kamihira teaches

the engine being an automobile engine Col. 20, Lines 31-33, Fig. 3).

Response to Applicant's arguments

6.   The Applicant's arguments have been fully considered but are not persuasive.

In reference to Applicant's arguments:

Kaehler discloses a conventional fuzzy logic system in which membership of
individual data points in a fuzzy set is determined and a degree of membership is
assigned to each individual data point. Kaehler does not teach or suggest an ability to
characterize a curve of data points. Specifically, Kaehler does not teach or suggest "...
using Fuzzy Logic to describe said curve represented by said curve data...", as recited
in applicants' claim 1.
The passages of Kaehler cited by the Examiner are a classic example of
determining membership of an individual data point in a fuzzy set. A value called "error"
and another value called "error-dot" are simple real numbers, and are compared with
respective membership functions to determine respective degrees of membership in

respective Fuzzy Sets. There is no teaching or suggestion whatsoever of a curve of multiple "error" or "error-dot" readings being compared with some standard curve, or in some other manner analyzed to determine a degree of membership in a Fuzzy Set which expresses a property of curves, such as "increasing", "constant", "decreasing", etc.

Examiner's response:

The claims and only the claims form the metes and bounds of the

invention. The Examiner has full latitude to interpret each claim in the broadest

reasonable sense. Error-dot is the slope or rate of change (a curve) of the error of the

data received (curve data). The system described by Kaehler uses the error-dot to

generate an output curve (a description of the data) using Fuzzy logic.

In reference to Applicant's arguments:

For the reasons stated, the claims as amended are not anticipated by Kaehler. Nor are the claims obvious over Kaehler, either alone or in combination with Kamihira. As noted above, Kaehler is entirely conventional in disclosing membership functions for individual data points. There is no suggestion that Kaehler should be extended to determine Fuzzy Set memberships for curves of data points, as opposed to individual data points. Kamihira is cited to show a control feedback system for a machine, in particular a motor vehicle engine, but does not otherwise teach or suggest any of the recited Fuzzy Logic features of applicants' invention, and in particular does not teach or suggest the characterization of a curve of data points.

Examiner's response:

As stated above, Kaehler teaches the characterization of a curve of data points

(error-dot, the slope or rate of change of the input data). Kahimira has been used to

reject other subject matter not present in the Kaheler reference.

In reference to Applicant's arguments:

Applicants have added new independent claim 30, which recites in somewhat different terms the features of their invention. For the reasons stated above, neither Kaehler nor Kamihira teach or suggest "...determining membership of [an] input curve in at least one Fuzzy Set..." or "...outputting at least one respective input curve membership value representing degree of membership of said input curve in each said Fuzzy Set...", as recited in claim 30, and new claim 30 is accordingly patentable over the cited art.

Examiner's response:

Kaehler anticipates the subject matter as set forth in the rejection of claim 30

above. The Examiner has provided how he interprets the Kaehler reference to read on

the subject matter claimed.

Conclusion

7.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

8.   Claims 1-30 have been rejected.

Correspondence Information

9.   Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandezrivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.
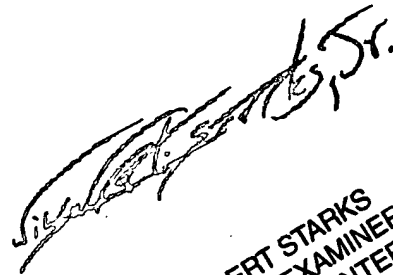
If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
Artificial Intelligence Art Unit 2129
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Friday, January 19, 2007

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